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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/078,473

02/21/2002

Hoki Kwon

V637-02992 US

4854

22913

7590

06/21/2004

WORKMAN NYDEGGER (F/K/A WORKMAN NYDEGGER &  
SEELEY)

60 EAST SOUTH TEMPLE  
1000 EAGLE GATE TOWER  
SALT LAKE CITY, UT 84111

EXAMINER

NGUYEN, DUNG T

ART UNIT

PAPER NUMBER

2828

DATE MAILED: 06/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/078,473

Applicant(s)

KWON, HOKI

Examiner

Dung (Michael) T Nguyen

Art Unit

2828

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 02/05/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Drawings***

The drawing was received on 04/01/04. The drawing is Figure 1.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 6-11, and 13-19 rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of McDermott et al. (Growth and doping of GaAsSb via metalorganic chemical vapor deposition for InP heterojunction bipolar transistors in Appl. Phys. Lett., Vol.68, No. 10, 4 March 1996).

With respect to claims 1-2, 8, 13, 16, and 18, the prior art shows in Fig.1 a VCSEL 10 comprising an InGaAsP active region 20 having a plurality of quantum wells, a substrate 12, and a tunnel junction 21. The prior art lacks the tunnel junction including a GaAsSb layer growth via MOCVD between 500 degrees C and 650 degrees C. McDermott teach a GaAsSb layer growth via MOCVD between 500 degrees C and 650 degrees C. For the benefit of a long wavelength VCSEL, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the prior art the GaAsSb layer growth via MOCVD as taught by McDermott.

With respect to claims 14-15, the prior art shows in Fig.1 a bottom DBR 16, a bottom spacer 18, an active region 20, a top spacer 22, and a top DBR 24.

With respect to claims 6-7, McDermott disclose TBA and CCl<sub>4</sub>.

With respect to claims 9, 11 and 17, McDermott disclose the GaAsSb layer concentration greater than  $5 \times 10^{19} \text{ cm}^{-3}$ .

With respect to claims 10 and 19, McDermott disclose a layer of InP.

Claims 3-5, 12, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of McDermott et al. (Growth and doping of GaAsSb via metalorganic chemical vapor deposition for InP heterojunction bipolar transistors in Appl. Phys. Lett., Vol.68, No. 10, 4 March 1996) and further in view of Cherng et al. (GaAs<sub>1-x</sub>Sb<sub>x</sub> growth by OMVPE in Journal of Electronic Material, Vol.13, No.5, 1984).

With respect to claims 3-4, 12, and 20, the admitted prior art and McDermott et al. disclose all limitations of the claims except for the value of x is 0.5. Cherng teach the value of x is 0.5 (page 1). For the benefit of a GaAsSb tunnel junction, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the admitted prior art and McDermott et al. the x value of 0.5 as taught by Cherng.

With respect to claim 5, Cherng disclose TmGa and TMSb.


**Communication Information**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dung (Michael) T Nguyen whose telephone number is (571) 272-1949. The examiner can normally be reached on 8:30 - 17:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on (571) 272-1834. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-3329.

Michael Dung Nguyen

  
Don Wong  
Supervisory Patent Examiner  
Technology Center 2800